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TECHNOLOGY SERVICE

SCIENCE NEWS LETTER

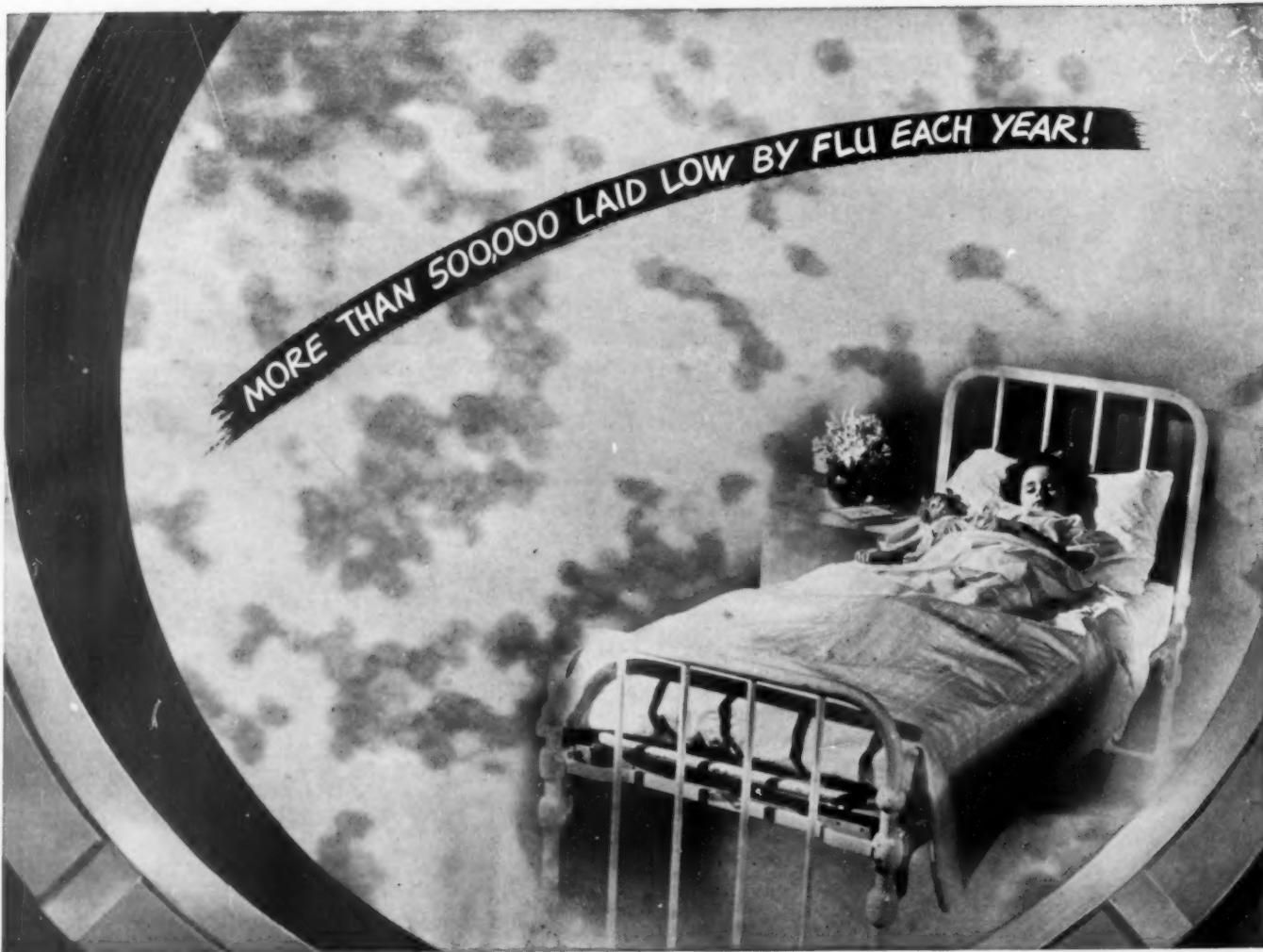
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THE WEEKLY SUMMARY OF CURRENT SCIENCE • JANUARY 27, 1945



Astronomy Lesson
See Page 57

A SCIENCE SERVICE PUBLICATION



to destroy 'em you have to see 'em

Microscopes are gunsights in Medicine's battle on bacteria.

Optical microscopes, however, were not powerful enough to "draw an accurate bead" on the deadly virus that caused influenza.

But today, medical men have seen what no optical microscope could bring into focus—the infinitesimal influenza virus that previously had lain craftily camouflaged among larger cells.

This revelation came about through the Electron Microscope, developed by scientists at RCA Laboratories. And now, having been seen, influenza may be forced to unconditional surrender, saving the lives of thousands each year.

Here is but one facet of the genius shown by scientists behind RCA research . . . the

"ever-onward" research that saves lives or creates a better radio with equal skill . . . the "there-when-you-need-it" research that gave super-secret equipment to the United Nations . . . the "way-ahead" research that goes into everything made by RCA.

When you buy an RCA radio or phonograph or television set or any RCA product, you get a great satisfaction . . . enjoy a unique pride of ownership in knowing that you possess the very finest instrument of its kind that science has yet achieved.



They see what human eyes have never seen before!

Drs. Arthur Vance and James Hillier, scientists at RCA Laboratories, with Mr. E. W. Engstrom, Research Director (standing), examine the RCA Electron Microscope that has useful magnification up to 100,000 diameters, revealing unseen new worlds to the eyes of man.

RADIO CORPORATION of AMERICA

PIONEERS IN PROGRESS



MEDICINE

Heart Disease Treatment

Penicillin is advised for subacute bacterial endocarditis, if the ailment is due to a streptococcus sensitive to the drug.

► PATIENTS with the kind of heart disease known as subacute bacterial endocarditis, heretofore almost always fatal, should be treated with penicillin if the heart ailment is due to a streptococcus sensitive to the drug.

This advice is given to the medical profession in a report by Dr. Martin Henry Dawson and Dr. Thomas H. Hunter, of Presbyterian Hospital and Columbia University College of Physicians and Surgeons, New York (*Journal, American Medical Association*, Jan. 20).

It is based on apparent success of the treatment in 15 out of 20 patients. These patients are in excellent health, free of all signs of the infection that caused their heart trouble, and all but three are back at work, housekeeping, or whatever their former occupations were. They might be called "cured" except for the fact that the period since the treatment was stopped is only a matter of months and in a chronic disease such as this more time is needed to be sure the germs have really been defeated.

Of the other five patients, two relapsed as soon as treatment was stopped but they are in excellent general condition and the doctors hope they will yet be able to cure them. The other three patients died. In two cases the infection was still present at the time of death and in the third the situation was doubtful.

Since the report on the 20 patients was written, seven more have been treated. Of these, six are well and one relapsed and is now getting additional treatment.

Drs. Dawson and Hunter first used

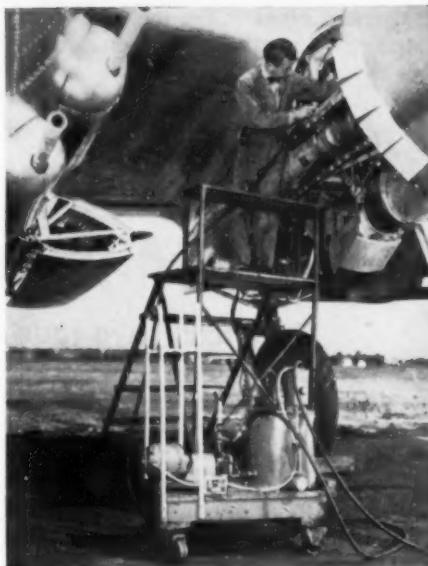
penicillin to treat subacute bacterial endocarditis in 1942 and 1943. The results were encouraging but because supplies of penicillin were then so limited, only two got enough to make recoveries. Another two have since been treated with larger doses combined with the anti-blood-clot chemical, heparin, and they also have now recovered. The fifth died of stoppage of a blood vessel in the brain but post mortem examination showed "substantial healing" of the heart condition.

Besides giving much more penicillin to the patients treated during the past year, heparin was also used. The combination of penicillin and heparin was first tried by Dr. Leo Loewe and associates at the Jewish Hospital, Brooklyn.

They tried heparin, with good results, because the germs that cause subacute bacterial endocarditis grow on the lining membranes of the heart in clumps mixed with fibrin from the blood. Buried in these clumps or clots, the germs are protected from chemical remedies circulating in the blood. Heparin counteracts the tendency of the blood to form clots in which the germs can grow safely and so should make the germs more vulnerable to attack by penicillin.

Drs. Dawson and Hunter found, however, that in five cases they got as good results without heparin as with it in other cases when large doses of penicillin were used. Giving this drug by continuous drip into the muscles instead of into the veins or by repeated injections into the muscles keeps more of it in the blood and is more comfortable for the patient, they report.

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PORTABLE PRE-OILER—This compact device delivers pre-heated oil under pressure to the engines of B-26 Marauders. Developed at the Glenn L. Martin Company, it has demonstrated its value both as a saver of man hours and a preventer of failures due to improper lubrication of an engine prior to its first start.

eases of the present war.

The blood's weapon against jaundice is the gamma globulin which is also medical science's most recent weapon against measles. Promising results with gamma globulin in jaundice are reported by Dr. Joseph Stokes, Jr., of Philadelphia and Capt. John R. Neefe, of the Army Medical Corps (*Journal, American Medical Association*, Jan. 20).

The gamma globulin is obtained from blood as a by-product in the processing of human albumin for treatment of shock. It was tried during an epidemic of jaundice in a summer camp for boys and girls last summer. It was given, by hypodermic injection into the muscles, to 53 out of 331 persons who at the time showed no signs of the disease, though the epidemic had been under way for over two weeks. About one-fifth, 20.8%, of those injected got sick compared with 67% among the untreated who developed hepatitis. None of the 53 treated, however, developed visible jaundice of the skin although three girls showed yellowing of the whites of their eyes.

The gamma globulin can apparently either prevent the disease or reduce the severity of an attack if it is given soon after a person has been exposed to it. This is comparable to its effect in measles. It might also be useful in treatment of

MEDICINE

Jaundice Weapon

Gamma globulin can apparently either prevent the disease or reduce severity of an attack if given in time, tests indicate.

► BLOOD DONATED to the Red Cross to save the lives of our wounded fighting men may also provide a weapon

to protect them against infectious hepatitis or infectious jaundice, which is said to be one of the most important dis-

jaundice if given before the skin-yellowing stage, the doctors suggest in their report.

"The results obtained in this epidemic are sufficiently encouraging to warrant further trials of gamma globulin in the

control of future epidemics of this disease," Dr. Stokes and Capt. Neefe state. "This is especially desirable because no other effective control measures have as yet been developed."

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MILITARY SCIENCE

Novel Military Devices

The Nazis have four-man sleeping quarters that can be rolled to the front line; Russians fit loud-speakers onto airplanes.

► SLEEPING QUARTERS for Nazi soldiers on the eastern front are being made with logs in the shape of a huge cylinder so that they can be rolled to the main line of defense by a team of horses. Each bunker is constructed from about 45 logs obtained from the forests in the area, and is equipped with bunks to accommodate four men. They are buried in the earth at a suitable depth and heaped over with earth.

This is only one of several examples of Allied and enemy ingenuity reported in *Military Review*, published by the Command and General Staff School at Fort Leavenworth, Kans.

Worried by the magnetic mines which the Allies have been latching onto the outside of their tanks, the Germans have developed a plastic coat, somewhat like rough linoleum, to prevent the mines from being attached. This coat is put on the exterior surface of the tank and colored with camouflage paint.

In World War I, the Germans used disguised freighters and fishing boats to trap Allied submarines and destroyers. When one of our boats would get in close to investigate, hidden guns would pop out and open fire. Today, German trains, beating a swift retreat from French battle lines, are trying to trap low-flying Allied strafing planes by waiting until the attacking aircraft has reached a low point over the railroads cars, then dropping the sides, uncovering rapid-fire Bofors anti-aircraft guns. Reports from the front indicate that they have not been very successful.

A further example of Nazi ingenuity is the use of turrets from knocked-out German tanks to form miniature fortresses. The turret, and its 75-millimeter gun, are removed from the damaged tank, sunk low in the ground, and imbedded in cement. A hole is dug adjacent to the emplacement to house ammunition and crew, and the surrounding

area is mined. British 17-pounders find it difficult to dislodge these tank-turret fortresses, and rocket-firing aircraft, which can dive straight onto the strongpoints have found them difficult targets to hit.

But the Nazis do not have a corner on inventiveness or ingenuity. Reports from German sources, published in England, reveal that the Russians are using airplanes fitted with loud-speakers. These talking sky-giants fly low over concentrations of Nazi troops and civilian areas spreading propaganda designed to lower their morale.

The British have revealed a formidable weapon in a new special mortar mounted on a vehicle similar to a Churchill tank, the interior of which is designed to accommodate a large crew and special explosive charges. Known as the AVRE, the assault weapon hurls a charge containing many times the weight of explosive of any other known projectile of similar dimensions against concrete, steel, or masonry obstacles. This bomb is called the "Flying Dustbin." The AVRE is also equipped to carry and place in position carpets of flexible tracks (made from chestnut palings) to enable vehicles following after it to cross beaches, sand dunes, or patches of marshy ground.

The Royal Air Force is chasing cyclones these days in the Bay of Bengal with a long-range flying meteorological station. When land reports suggest that a treacherous storm is brewing, they fly out hundreds of miles deliberately seeking out bad weather. The flying meteorological station was put into use when it was discovered that ground reports might not give enough warning of devastating cyclones which spring up in that part of the world. As much as three days warning of the approach of bad weather can be given by making these weather flights.

Our own Wright Field's equipment

laboratory has developed special emergency equipment for the Air Transport Command's India-China Wing. This specialized rescue kit contains both Arctic and tropic accessories for crews that might have to bail out over snow-covered mountains or jungle areas when flying "over the Hump." Because some of the trees in the jungle grow to a height of 100 feet, and jungle growth makes parachutes difficult to spot, a 300-foot red and white streamer is attached to the kit to make it easier to spot.

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GENETICS

Chemistry Aids Genetics

Study of molds show how heredity is linked with ability to make from its food medium the necessary compounds to sustain life.

► CHEMISTRY has come to the aid of biology in solving some of the more difficult questions of how parental characters are passed on to offspring—and of how these characters sometimes change, giving rise to new evolutionary lines or pinching off old ones.

Specifically, it is biochemistry that is thus helping forward the study of genetics, Prof. G. W. Beadle of Stanford University declared, in a lecture given under the auspices of the Society of Sigma Xi at the University of Oregon. This was the first of a series of national Sigma Xi lectures by Prof. Beadle at various universities throughout the nation.

Earliest studies in genetics, like the classic researches of Mendel, concerned themselves with easily visible differences in organisms, such as color of flowers or seeds in plants, shape of wings or kind

of hair in animals. A great deal of profitable work is still being done along those lines.

However, plants and animals also have definite modes of inheritance in their invisible internal chemical reactions. What they do with their food, how they build it into their body substance, how they may sicken and die for lack of an indispensable hormone or vitamin, are as definitely controlled by their genes as are color, shape or size of body parts. These intricate reactions in life-chemistry are the present subjects of research by Prof. Beadle and his associates at Stanford University, and of other investigators elsewhere.

The special organism chosen by Prof. Beadle is a species of red bread mold, which makes a very desirable vegetable guinea-pig for a number of reasons, out-

standing among which are the ease with which it responds to breeding techniques and the sharpness of the differences its new strains show in their biochemical reactions.

The mold is induced to undergo gene changes by bombarding it with X-rays, ultraviolet radiation or neutrons. Sometimes a gene drops out of its makeup. In some of these cases, the result is a new strain of mold that cannot put together the simpler compounds in its food medium to make some necessary item in an organism's life-equipment—vitamin B₁, for example.

Ordinarily, of course, such a deficient strain would die, but by artificially supplying the lacking food element it is possible to keep alive and to continue studies on its hereditary behavior.

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CHEMISTRY

Wood Products Laboratory Opened in Washington

► A NEW LABORATORY for improved physical and chemical utilization of wood and its products was officially opened in Washington, D. C. The Teco-Shop Laboratory of the Timber Engineering Company is appropriately located in the middle of a wooded area. Hosts for the day were C. A. Rishell, director of research, and Harry Uhl, president.

The laboratory is composed of two divisions. Dr. Eduard Farber is in charge of the chemical division, which has already made advances in the study of the utilization of lignin, partner of cellulose in wood, but all too frequently regarded as a waste product. J. L. Stearns heads the physical department where soft grades of wood are made hard under impregnation. Gaily hued pieces of wood have been colored not just on the surface, but throughout, by this process.

The wood products development shop and wood chemistry laboratory are expected to provide an additional link between basic research organizations such as the U. S. Forest Products Laboratory and practical application of this research.

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AERONAUTICS

8-Passenger Helicopter Has Two Engines

► DESIGN DETAILS of a new helicopter that will carry eight persons reveal that it has two 300-horsepower engines and windmill-like rotor blades 56 feet



CHEMICAL LAB—A view of the chemical laboratory of the Timber Engineering Company in Washington, D. C., where research into lignin and other chemical phases of wood is conducted. Left to right are: Carl Rishell, Director of Research; Dr. Eduard Farber, Director of Chemical Research; S. Sibelius and Dr. M. Sciascia.

long. The length of the blades is greater than the wingspan of some of our top fighter planes, including the P-38J, P-40, P-47 and P-51. The two engines will thrust the craft through the air at a cruising speed of 90 to 100 miles an hour, according to Agnew E. Larsen, of Rota-Wings, Inc., the manufacturer, in a report (*American Aviation*, Jan. 1).

"The failure of one engine will not result in any appreciable change in the operating characteristics of the craft," Mr. Larsen remarked.

In the event of one engine failure it

would take less than one-tenth of a second to switch over to single-engine operation.

The overall height of the proposed helicopter is 13 feet. It will weigh 4,450 pounds and carry a load of over a ton. Estimated cost, without engines or radio, is \$37,000. Mr. Larsen states that the new craft can gain altitude at a rate of 1,400 feet a minute.

Construction of a mockup of the plane is beginning, and it is expected that the craft will be in production within a year.

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COMMUNICATIONS

Civilian "Walkie Talkie"

May become a part of your household equipment, following FCC approval. Bands set aside for industrial and medical radio to prevent interference.

► "WALKIE-TALKIE," the powerful one-man broadcasting station that provides reliable short-range communications between military units today, may become a part of your household equipment, just like your radio or refrigerator. Under the heading of "Citizens' Radio Communication Service" the Federal Communications Commission has allocated the portion of the radio spectrum between 460 and 470 megacycles to the new radio service.

The news about "walkie-talkie" for civilian use was released as a part of a preview of America's postwar radio spectrum in a proposed frequency allocation plan issued by the FCC.

Housewives will be able to keep in direct touch with their husbands, with "walkie-talkie" installed in automobiles and stores. Doctors, farmers and professional men can use "walkie-talkie" to keep in contact with their offices or homes while making calls. Department stores, dairies, laundries and other business organizations can use the service to communicate with their delivery vehicles.

No technical knowledge will be required by the FCC to operate one of these devices. "Walkie-talkie" equipment in one popular form consists of a small box containing transmitting and receiving devices, with a microphone and earphone built into a hand-set like a familiar telephone unit. It is powered by batteries, has a practical range of several miles and weighs about 35 pounds.

At FCC hearings in September, the railroads demonstrated that radio would contribute to the safety of life and prop-

erty and should be of almost universal benefit to the public. Therefore the Commission has set aside several channels for such use.

Three bands have been assigned for industrial and medical radio equipment, to prevent interference with other radio services. This means that a diathermy machine operating nearby will not interfere with the reception of programs on your radio.

Rural telephone service, a new communication service to furnish a radio-telephone link for isolated communities, farmers, ranchers, miners and others who cannot be or are not served by regular telephone wire systems, will share the band of frequencies allocated to television by the FCC.

Commercial television is going to remain roughly where it is, thus settling for the time being one of the most controversial questions discussed at the allocation hearings, whether television should stay in the lower part of the spectrum, or move to higher frequencies. In its report, the FCC stated that commercial television should not be denied the public until a system in the ultra-high frequencies can be developed and proven, since the time that may elapse before such a system can be worked out is indefinite and depends upon the resourcefulness of industry in solving many technical problems. However, the FCC has set aside space in the ultra-high portion of the spectrum for experimental development of color pictures and wide-channel television.

This means that you can expect about

the same kind of television pictures that were possible before the war, with some wartime improvements, and that television sets selling from \$75 up will probably go on the market soon after the war.

You need not expect to see television at your local movie house for some time to come. Since theater television is still in the experimental stage, the FCC has not allocated any specific frequencies for the service.

Likewise, no specific allocation is made for subscription radio, the service which would carry no advertising but would be supported by rental of a device to eliminate a "pig-squeal" superimposed on the program being broadcast.

You may be able to have a newspaper printed in your own home by facsimile broadcasting, a system that permits the transmission of printed or typed material, drawings or pictures through the air to be reproduced on paper exactly as they are sent at the receiving end.

Since public interest requires that FM (frequency modulation), staticless radio, be established in a permanent place in the radio spectrum before a considerable investment is made by the listening public in receiving sets and by the broadcasters in transmitting equipment, the FCC has allocated 90 channels to FM, an increase of 50 channels over the present space held by the service, and has moved it up in the radio spectrum to a point between 84 and 102 megacycles.

About 160 educational institutions have expressed interest in non-commercial educational radio which may profoundly affect not only American education but our democratic institutions as a whole. Therefore, the FCC has allocated 20 of the 90 FM channels to this service.

Criminals of the future will find the way of the transgressor harder as the police build up radio communication networks with a greatly-increased number of frequencies allocated by the FCC. These channels will make possible facsimile networks for transmitting photos and fingerprints from one police department to another and to the FBI in Washington. Fire departments will also be able to use radio, since the FCC has increased the space allocated to this service.

G. I. Joe, returning from war and desiring to set up his own amateur station, will have plenty of spectrum to work in. The FCC has boosted the number of channels for this service which is one of the oldest in radio, whose development closely parallels that of the entire radio art.

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MILITARY SCIENCE

It Takes 50 Shots

Yank aerial gunners can put a Japanese bomber out of action with 50 shots, according to data taken during a six-week period.

► YANK AERIAL GUNNERS can put a Japanese bomber out of action with 50 shots, according to accurate data taken during a six-week period on Guadalcanal. In the last war it took nearly 10,000 rounds of ammunition to put one airplane out of action. These facts were revealed by Col. Scott B. Ritchie, Assistant Chief of the Research and Development Service, Office of the Chief of Ordnance, U. S. Army, in an interview with Watson Davis, director of Science Service, on the CBS program "Adventures in Science."

The great improvement over the World War I record can be accounted for by the Army Ordnance research conducted during peacetime years. About 75% of the 1,200 major ordnance items now in use by our armed forces have been newly designed, or improved, since the beginning of the war, Col. Ritchie said.

"Great strides have been made in the field of materials since the beginning of the war," he pointed out. "Silk cloth was used as a container for propellant powder for many types of loading ammunition before this war. Silk was a strategic material because the Japs controlled practically all raw silk production, and artificial silks proved unsatisfactory. As a result of Ordnance research, suitable cartridge cloths of cotton were standardized. These cotton cloths not only overcame the shortage, but effected savings in cash which, during the first year of the war, amounted to more than the total amount of money allotted directly to research on explosives during the interval between World War I and World War II."

Research has brought forth new high explosives and new propellants for weapons to meet a variety of requirements.

Col. Ritchie expressed the view that the trend in explosives has been toward more powerful performance, with the usual safeguards with respect to dependability and safety in handling. None of the propellant powders used in the last war are being manufactured today for ordnance.

Many of our new explosives are based on a compound known by the code name RDX. These new explosives have greater blast effect than can be obtained with standard TNT. Hale-ite, another new explosive, has a greater power or shattering effect than TNT and differs in certain characteristics from RDX, he stated.

The powerful explosive used in the bazooka rocket is Pentolite, a combination of a very high explosive PETN, and TNT. PETN is too sensitive to be used alone, except in fuses as primacord. Another explosive discussed by Col. Ritchie, is a plastic material which can be molded like putty with the hands so as to conform and stick to the surface of an obstacle, such as a tank. It will work under tropical conditions as well as at sub-zero temperatures.

"Millions of our rockets of various types have been fired in combat and new developments are on the way," Col. Ritchie pointed out. He also stated that many of our most important weapons are still in their infancy.

Col. Ritchie told of the 120-millimeter antiaircraft gun, known as the "stratosphere cannon," that fires a projectile to an altitude of 60,000 feet. It can be used against land targets as well as aircraft. Our tank-destroying 90-millimeter gun can be fired accurately at a target 18 inches in diameter at a range of 6,000 feet.

"Our ordnance is superior to that in the hands of our enemies, but we can never remain satisfied. We must make absolutely sure that continuing research and development will keep it always ahead. Only in that way can we be certain that the peace we are striving for will endure," Col. Ritchie concluded.

Mr. Davis added that it is the responsibility and privilege of our nation's young scientists to help keep ordnance research alive. He pointed to the work of one of the Science Clubs of America in Webster Groves, Mo., where a group of boys built a rocket that shot through the air for a distance of 224 feet. It was made of one-half by five-inch brass tubing and filled with a powdered zinc-sulfur mixture.

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CARGO-VERSION—Designed for high speed, long range, large passenger capacity and low operating cost, this is the giant Boeing 377 postwar commercial air liner recently announced by the Boeing Aircraft Co. The airplane, a four-engine, two-deck transport developed from the famous B-29 Superfortress, is the first of the larger size super-transports of the future actually to have been built.

MEDICINE

Penicillin Plus Albumin May Prove More Effective

► MORE EFFECTIVE penicillin treatment may result from a new penicillin substance announced by Dr. Bacon F. Chow and Miss Clara M. McKee, of the Squibb Institute for Medical Research (*Science*, Jan. 19).

The new substance is a combination of penicillin and the albumin of human blood serum. Its promise of increasing the effectiveness of penicillin treatment is seen in the fact that, in mice at least, it is excreted from the body more slowly than the sodium salt of penicillin, the form of the mold chemical used for treating patients. The more slowly penicillin is excreted, the longer it can act on infecting microorganisms and the less is needed for treatment of a given case.

Several other methods of delaying penicillin excretion have been developed. This is the first report, the Squibb researchers believe, of a penicillin compound with a delayed excretion rate. The other methods involved suspending penicillin in oil, giving other chemicals with penicillin, or chilling the region where penicillin was injected.

Whether the penicillin-albumin combination is a true chemical compound is not yet known. The fact of its slower excretion suggests that it is. Unlike a similar combination of albumin and sulfa drugs, which some investigators believe has no germ-checking activity, the penicillin-albumin combination does have anti-germ activity.

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ENGINEERING

Tiny Ball Bearings Vital For Successful Bombing

► SUCCESS OF AMERICAN precision bombing depends upon the mass-manufacture of some of the smallest ball bearings in the world, reports Major R. J. Pask, of the Air Technical Service Command. These tiny ball bearings are a vital part of the Norden bombsight.

Until 1940, the smallest bearing assembly which American industry had produced had an over-all dimension of three-eighths of an inch in diameter, including inner and outer rings. The smallest ball being made in America at the time was one-sixteenth of an inch in diameter. Germany was supplying balls about one twenty-fifth of an inch in diameter.

In the summer of 1941 the foreign source of supply was cut off. As a result of research, the American ball bearing industry is now producing these tiny bearings in large enough quantities to meet the demands of the Army Air Forces.

The Norden bombsight, at that time, called for 61 ball bearings of 25 different types, upon which the actual operation of the bombsight depended.

Some idea of the sensitivity of the ball bearing assemblies can be gained from a "brush" test to which they are subjected. The bearing is first placed in a steel wheel, weighing exactly three and one-half pounds, then mounted on an axle. Next the hairs of an ordinary camel's-hair brush, like those used by artists, are drawn lightly over the heavy ring. This extremely light touch has to move the ring and bearing back and forth.

About 18,000 different kinds of bearings are being made today to supply war demands. The Army Air Forces alone require approximately 100,000,000 bearings in addition to 35,000,000 steel balls and 25,000,000 roller bearings.

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PHYSICS

Fused Magnesia Used in High-Temperature Lamp

► SMALL mercury-vapor lamps designed to operate at very high temperatures—hotter even than fused quartz will stand—are the subject of patent 2,367,595, obtained by John W. Marden of East Orange, N. J. To stand up against such temperatures, highly refractory materials such as fused magnesia or alumina are introduced into the quartz envelopes, either as sleeves or baffles. Rights in the patent are assigned to the Westinghouse Electric & Manufacturing Company.

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AERONAUTICS

Whirling Jets of Air Wipe Plane Windshield

► WHIRLING JETS of air under high pressure are substituted for the familiar rubber-edged arm of the automobile windshield wiper in a device for keeping the windshields of aircraft clear of water and ice, on which W. N. Patterson of Detroit has received patent 2,367,426. To make sure of dislodging the ice in winter, small quantities of alcohol or other non-freezing liquid are injected into the air-jets.

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IN SCIENCE

SEISMOLOGY

Japan's New Earthquake Centered Off Honshu

► JAPAN'S most recent earthquake was centered under the ocean floor off the coast of the Empire's principal island of Honshu, about 125 miles south of Tokyo. This epicenter determination was made by seismologists of the U. S. Coast and Geodetic Survey, on the basis of telegraphic reports forwarded through Science Service from three observatories.

The shock was not as severe as the big earthquake that shook Japan on Pearl Harbor Day, Dec. 7; it was apparently an aftershock of that disturbance. Point of greatest movement was in the region of latitude 34 degrees north, longitude 139 degrees east. Time of origin was 2:38.6 p.m., EWT, Jan. 12.

Observatories reporting were those of Weston College in Massachusetts, and the U. S. Coast and Geodetic Survey stations at Tucson, Ariz., and Honolulu, T. H.

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ENGINEERING

Coil Spring for Tractor Eases Work of Driver

► A SPECIAL coil spring, and a shock absorber, is the basis of a new suspension-type tractor seat which will take all the jolts out of riding the farm tractor over rough plowed land and ease the work of the driver. It may perhaps decrease the high degree of kidney and skeletal disorders among farmers blamed on the all-day-long tractor jarring. The new tractor seat was developed by the Monroe Auto Equipment Company, which developed and has made thousands of seats for war tanks.

The coil spring is placed directly under the driver's seat, and the triple-action hydraulic shock absorber at the rear. The absorber is similar to those commonly used in automobiles. Together the two devices give stability that enables the rider to stay level while the tractor bobs over rough ground.

The construction of the new device is simple and inexpensive, and it can be installed on all makes of tractors. It can also be applied to truck seats.

Science News Letter, January 27, 1945

SCIENCE FIELDS

ASTRONOMY

Pilots Learn Astronomy By Recognition Trainer

See Front Cover

► PILOTS ARE LEARNING astronomy through a new star recognition trainer, as shown in the official U. S. Navy photograph on the front cover of this SCIENCE NEWS LETTER. The stars are projected on the canopy through holes pierced at proper places in the globe shown in the foreground, as the globe rotates. This makes it possible for the instructor to demonstrate the relationship of the heavenly bodies to one another and explain their apparent motion as seen from the earth.

This is one of the many devices developed at the Navy Bureau of Aeronautics, Special Devices Division, under the direction of Capt. Luis de Florez, which aid in the realistic training of Navy flyers.

Science News Letter, January 27, 1945

MEDICINE

New Anti-G Flying Suit Weighs Only Two Pounds

► AMERICA'S NEWEST anti-G suit, which prevents fighter pilots from having a dimming or blacking out of vision during aerial maneuvers against the enemy, weighs only two pounds, Capt. George L. Maison, of the Aero Medical Laboratory, Wright Field, reports. Capt. Maison, who before the war was professor of physiology at Wayne University, and Lt. Col. F. G. Hall, of the physiology department at Duke University, are credited with the development of the anti-G suit, which both the Army and the Navy and some of our Allies now use as standard equipment. (See *SNL*, Jan. 13)

Weight has been an important factor in the development of the suit, Capt. Maison declares. The early anti-gravity pressure suits had valves weighing as much as 14 pounds. The British developed a very heavy suit which was filled with water instead of compressed air. This suit, developed early in the war, looked like a pair of duck-hunter's pants, and was very uncomfortable to wear.

The AAF G-suit is being used in the

European and Italian theaters, Capt. Maison stated. Pilots in AAF fighters, which are among the fastest aircraft in the air today, are provided with the suits. These planes can fly faster than 420 miles an hour and have an operational ceiling of 40,000 feet.

The new suit is a modification of one designed by the U. S. Navy, adopted after extensive tests on the human centrifuge at Wright Field. This human centrifuge was developed to measure the blackout tolerance of pilots and suits before, during, and after simulated power dives, building up pressures equivalent to from five to seven times the force of gravity, Capt. Maison commented.

The great success of the suit lies in the way it combats the effects of such forces on the body by applying pressure to the pilot's lower legs, thighs, and abdomen during aerial maneuvers, thus preventing blood from pooling in the lower extremities and permitting the heart to maintain circulation to the brain. Without the G-suit, forces which may amount to three to nine times that of gravity prevent the heart from pumping sufficient blood to the brain. This results in a blacking out of vision. The pilot usually remains conscious during a blackout, but unconsciousness may follow if the excessive force is prolonged for a few seconds, Capt. Maison explained.

Pressure in the anti-G suit is supplied by air bladders. The bladders are inflated by compressed air from the airplane's vacuum instrument pump. It takes only two seconds to inflate or deflate the bladders when the force rises above or falls below twice that due to gravity. All the pilot has to do is zip on the suit and plug it into the air line before taking off.

The over-all effect of the G-suit, like the oxygen mask, the pressure cabin, and the electrically heated suit, has been to enable the pilot to match his tolerance limit with that of his airplane, Capt. Maison pointed out.

Science News Letter, January 27, 1945

GENERAL SCIENCE

New Secretary Elected for Smithsonian Institution

► THE BOARD of Regents of the Smithsonian Institution, at their meeting on Jan. 12, elected Dr. Alexander Wetmore to be Secretary of the Institution, succeeding Dr. Charles G. Abbot, who retired last June. Dr. Wetmore, well known for his researches in ornithology, has held the post of Assistant Secretary since 1925.

Science News Letter, January 27, 1945

CHEMISTRY

Shape of Large Molecules In Plastics Determined

► THE SIZE and shape of large molecules in plastics can now be determined rapidly and visually by the use of two instruments recently developed and tested in the laboratories of the Polytechnic Institute of Brooklyn. They will be valuable to manufacturers using various types of synthetic rubbers, plastics and fibers by extruding, molding, casting and spinning processes in which the size, shape and weight of the molecules play an important part.

Better rubber tires and shoes, plastic combs, buttons and other articles, and fibers like rayon and nylon, result when the size and shape of the molecules in the materials used are known. Viscosity is now used as a rough criterion for these fundamental properties; with the new instruments scientific measurements will replace this none too satisfactory method.

The two new instruments, based on simple visual observations through a microscope, employ the scattering of light to learn about the size, shape and weight of the large molecules in synthetic rubbers and plastics. The principle of the scattering of light was discovered in 1910 by Dr. Albert Einstein, and its application to computing molecular weight and shape of giant molecules was discovered in 1943 by Dr. Peter Debye of Cornell University. Dr. Paul M. Doty, of the Polytechnic Institute staff, is largely responsible for the development of the instruments.

Science News Letter, January 27, 1945

MEDICINE

AMA Cancels Meeting Scheduled for June

► THE AMERICAN Medical Association has cancelled its annual meeting, scheduled for Philadelphia, June 18-22. This action was taken by its board of trustees in order "to cooperate to the fullest possible extent with the request of the Office of Defense Transportation and in the interest of the nation's war effort" (*Journal, American Medical Association*, Jan. 20).

This is the fourth time in the Association's 95-year history, and the second time in this war, that an annual meeting has not been held. The other two cancellations, in 1861 and 1862, were also war-caused.

Science News Letter, January 27, 1945

ASTRONOMY

Jupiter Joins Venus

The two brightest planets are visible at the same time in the evening sky during February; Saturn is seen high in the sky.

By JAMES STOKLEY

► WITH THE COMING of February, the two brightest planets are visible at the same time in the evening sky. For the past few months Venus has been drawing eastward from the sun, and on Feb. 2 is at her farthest east position, setting about four and a half hours after sunset. At the same time Jupiter has been moving in a westerly, or "retrograde," direction in the sky. Until recently he was visible only after midnight, but this month he appears in the east less than three hours after sunset. This means that there is now a period in the evening, between three and four hours after the sun has gone down, that both planets are above the horizon.

Venus Appears First

Venus, in the west, is so brilliant that it appears long before any other star or planet, and is not difficult to locate. Jupiter, which appears low in the east, in the constellation of Virgo, the virgin, is less than a sixth the brilliance of Venus, but that still makes it brighter than any star. And in addition to these two, there is a third planet high in the south. This is Saturn, which stands in Gemini, the twins. Its brightness is about as much below Jupiter as that orb is fainter than Venus. As you look at them in the sky, however, the difference will not seem as great. Both Venus and Jupiter, when you can see both at once, are low in the sky; their light has to pass through a greater thickness of the earth's atmosphere than does that of Saturn, which is higher. If Venus and Jupiter were equally high, they would look considerably brighter.

Even Saturn is brighter than any of the stars now visible, with one exception. This is Sirius, the dog star, in the constellation of Canis Major, the great dog. This group and others are shown on the accompanying maps, drawn for approximately 11:00 p.m., war time, on Feb. 1 and 10:00 p.m. on Feb. 15. Canis Major is in the south, directly below the figure of the Gemini, in which Saturn is found.

Gemini and Canis Major make up part of a group of constellations which

contain more bright stars than any other part of the sky of equal area. Orion, the warrior, is the most conspicuous of these, with first magnitude Betelgeuse and Rigel, between which are the three stars in a row that form Orion's belt. High in the southwest, the other side of Orion from Sirius, is Taurus, the bull, with first magnitude Aldebaran. Above and to the left of Canis Major is Canis Minor, the lesser dog, with Procyon. In Gemini is Pollux, another of the first magnitude, and directly overhead, in Auriga, the charioteer, is Capella, which also belongs to this class. And off to the east, directly above the group of Virgo in which Jupiter stands is Leo the lion with the bright star Regulus.

It is not unusual for Venus to appear brilliantly in the evening sky the way it does at present. Once in a period of a year and seven months it reaches such a position but when it gets so bright it is always a bit surprising to those not used to it. Indeed people sometimes find it hard to believe that it is really a celestial body. In eastern New York state, for example, when it became so brilliant, the report used to go around that it was the "Edison star," an artificial light that Thomas Edison hung over Schenectady!

Venus is now so bright that it can be seen in the daytime. On Feb. 15, for a person on the central meridian of his time belt, the planet is directly south at 4:02 p.m., war time. Then it is about half way from the horizon to the zenith

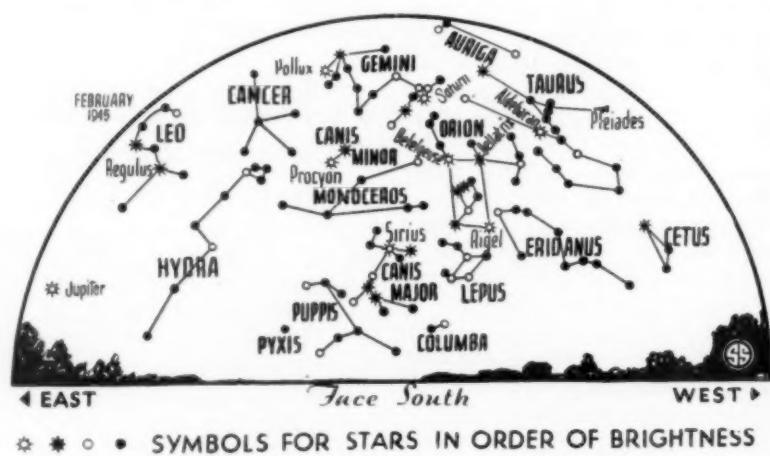
and should be located without great difficulty, if one is shielded from the direct glare of the sun. For points east of the central meridian, it will be south a little earlier, and for more westerly points a little later.

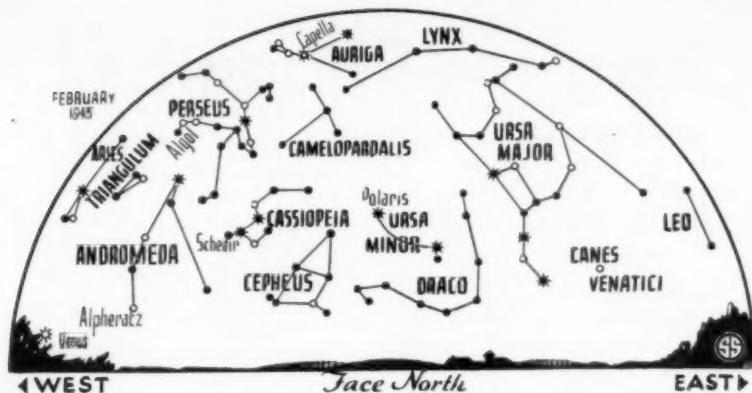
During the first part of the month, before the light of the moon interferes, one can even see shadows cast by Venus. This will be particularly noticeable out of doors, away from street lights, and where there is clean snow on the ground.

Through a telescope Venus is most interesting. At the beginning of this month it has the shape of a half moon, that is, it appears as a semicircle of light. But after this it becomes a crescent which gradually narrows. These changing phases of Venus are similar to those of the moon, and are caused in the same way. A few months ago, when Venus was well on the opposite side of the sun from us, its entire sunlit half was presented to our view and we saw a complete circle. Now the line from the planet to us is at right angles to that from Venus to the sun, which means that half the sunlit hemisphere is turned away from us, or that the half which is toward the earth is only partially illuminated. Consequently we see a semicircle of light.

Becomes a Crescent

As Venus comes more and more between the sun and earth, we see still less of the illuminated side, and it becomes a crescent. There is, of course, one important difference between the phases of Venus and of the moon. The latter remains at approximately the same distance, no matter whether full or new. Venus, on the other hand, is much closer





when it is a crescent, and hence appears larger. Also, on account of its approach to us, it continues to become brighter, until the crescent becomes extremely narrow. On the tenth of March it will reach maximum brightness, but then will be only about a third brighter than it is now.

Celestial Time Table for February

Feb. EWT
2 Noon Moon farthest, 251,700 miles
6:00 p.m. Venus farthest east of sun

5	5:55 a.m.	Moon in last quarter
10	5:38 p.m.	Moon passes Mars
12	1:33 p.m.	New moon
13	4:48 a.m.	Algol at minimum
14	8:00 a.m.	Moon nearest, 224,700 miles
15	4:07 p.m.	Moon passes Venus
16	1:38 a.m.	Algol at minimum
18	10:27 p.m.	Algol at minimum
19	4:38 a.m.	Moon in first quarter
21	5:03 p.m.	Moon passes Saturn
24	7:16 p.m.	Algol at minimum
26	4:06 p.m.	Algol at minimum
28	8:07 p.m.	Full moon
	1:43 a.m.	Moon passes Jupiter

Subtract one hour for CWT, two hours for MWT, and three for PWT.

Science News Letter, January 27, 1945

MEDICINE

Sleeping Sickness Weapon

A new chemical for treatment of the African disease may be able to cure patients in the early stages in less than two weeks.

► A NEW CHEMICAL weapon against African sleeping sickness is announced by Dr. Harry Eagle, of the U. S. Public Health Service and Johns Hopkins University (*Science*, Jan. 19).

The chemical is gamma-(p-arsenosophenyl)-butyric acid. Large-scale field trials, planned to include over 1,000 patients, were started last summer with the collaboration of the Sleeping Sickness Services of the Gold Coast, Nigeria, the Belgian Congo and the British Forces in West Africa.

Results of treatment of more than 200 patients so far show that with this drug it may be possible to cure patients in the early stages of the disease in less than two weeks. Treatment with other drugs may have to continue for as long as 12 or 15 weeks, according to some published reports. Results with the new drug in treatment of late stages of the disease are not encouraging, however.

The new drug is given by injection into a vein. In the field trials it was given twice weekly, three times weekly and daily, the variation being planned

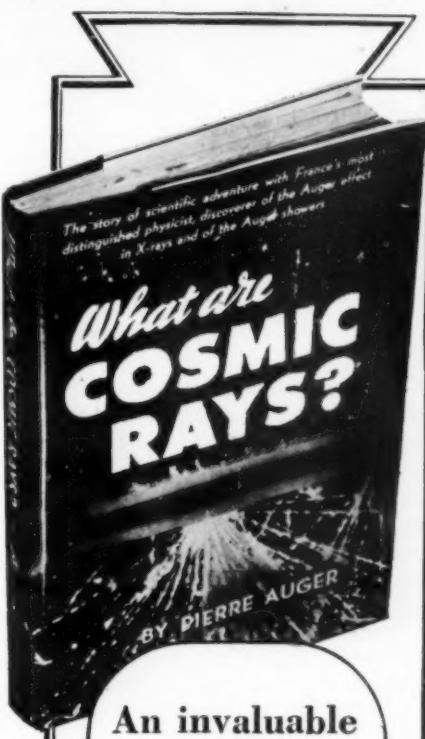
to determine the best schedule. More than 800 injections of it were given to over 100 patients, with no toxic reactions except for occasional nausea and vomiting after about 2% of the injections.

The drug seems to be active against strains of trypanosomes, the germs of African sleeping sickness, which are resistant to the widely used sleeping sickness remedy, tryparsamide, and other arsenicals. It may be effective against some, though not all, forms of the disease in animals.

Mass treatment of this widespread scourge of tropical Africa may be greatly simplified, Dr. Eagle suggests, and considerable time and money saved by this new drug.

Science News Letter, January 27, 1945

Baby minks, which finally produce fur for ladies' coats, weigh only about one-eighth of an ounce at birth; in six weeks they are the size of red squirrels and at six months of age are some 20 inches long.



An invaluable addition to the literature of physics

BY PIERRE AUGER

A comprehensive, authoritative, and accurate explanation of one of the most important discoveries of modern physics.

France's most distinguished physicist, discoverer of the Auger effect in X-rays and of the Auger showers, traces the story of cosmic rays from their discovery to the most recent experiments in the field . . . A story of adventurous research, in the laboratory and at the ends of the earth, that has opened new worlds to the mind and skills of man.

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BOTANY

NATURE RAMBLINGS

by Frank Thone



South for Evergreens

► EVERGREENS, to most people, mean needle-leaved, cone-fruited trees that grow in northern lands. So general is this concept that when Kipling wrote of "dominion over palm and pine," the phrase was taken as an obvious though striking metaphor picturing the tropics-to-polar sweep of the British Empire.

However, had Kipling taken the trouble to look about the tropical parts of the Empire a bit, he would have found plenty of pines growing in them. To take a nearby example: if you were suddenly set down on the coastal plain of British Honduras and asked to guess where you were, you might well answer Florida or Georgia. For large parts of that definitely tropic land are dominated by a close approximation of the same pine forest that we have on our own Gulf coast.

Popular impression is mistaken not only about the geographic distribution of the needle-leaved evergreens, but also in the meaning of the word evergreen itself. It is true that pine and spruce and fir and cedar are evergreens, but they are not

the only evergreens. Any tree or shrub, or even herb, that holds onto its green leaves, or at least a good part of them, throughout the year is an evergreen. Thus, the bearberry and club-mosses that carpet the soil under the pines in the North are evergreens as much as are the trees themselves. So are such non-woody plants as Christmas fern, polypody and hepatica.

In regions where winters are relatively mild, there are many evergreen trees and shrubs that are not needle-leaved coni-

fers. Ready examples can be found in our own South: magnolias of several species, liveoaks, holly, rhododendron, mountain laurel, leucothoe, jasmine, cat-brier—the list might be extended almost indefinitely. And of course the palms themselves are evergreens par excellence: very few plants hang onto their leaves so persistently. In fact, it might fairly be said that the nearer you get to the equator the more kinds of evergreens you will find.

Science News Letter, January 27, 1945

MEDICINE

Warning for Allergists

► WHEN THE PATIENT says the spell of extremely cold weather has caused him to have an attack of asthma, he is right but so is the allergy specialist who says it is not the cold but feathers that are the cause of his asthma, as shown by scientific tests.

Feathers in such a case are the primary cause but cold weather may be a secondary or predisposing factor, Dr. Samuel M. Feinberg, of Chicago, explained in a report at the Seventh Annual Forum on Allergy, held in Pittsburgh.

The secondary factors which may aggravate or bring on allergic symptoms "are usually given too much importance by the public and general medical profession and too little importance by allergists," Dr. Feinberg declared.

"Their proper role should be appreciated because frequently the specific cause of the allergy cannot be found and then only the secondary cause can be managed," he said. "Even when the primary cause is known, benefit can be derived from the attention given to the predisposing causes."

Some of the common secondary factors, he said, are chemical, mechanical, thermal, nervous and mental, weather and climate and infections.

A common cold, for example, will make the allergic nose more troublesome. So will the mechanical action of chalk dust which school teachers with nasal allergy usually think is the cause of their allergy.

Inhaling soft coal smoke, gasoline fumes, paint odors and the like may be a chemical factor that brings on an attack of asthma though the primary cause is a food or pollen.

Emotional upsets, excitement, worry and similar nervous disturbances may

precipitate or aggravate allergic symptoms, though in Dr. Feinberg's opinion it is doubtful whether such nervous factors by themselves are able to cause diseases such as asthma, hives or eczema.

Science News Letter, January 27, 1945



PLASMA PRODUCTION HELPED BY MICROMAX

The extremely high purity which Sharp & Dohme, Inc. maintain in the water they distill for blood-plasma is, of course, guarded in several ways; and among the most effective is the measurement of electrolytic resistance of the stream as it issues from the automatic stills of the S&D plant in Philadelphia. Even the best still can be operated in such a way as to let impurities pass, but impurity lowers the water's resistance and can be the basis for extremely prompt corrective action.

The protective equipment consists of a Micromax Conductivity Recorder, connected to a cell in the effluent stream and to a signal-light and alarm buzzer. The Micromax operates continuously; when resistance reaches a predetermined danger point, it calls the operator and he merely diverts the effluent until resistance rises.

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ENGINEERING

Better Postwar Cars

May be vastly improved and have longer life as a result of faults brought to light by long-time ownership of cars during the war.

► YOUR POSTWAR car may be much better and have longer life as a result of information the automotive industry is getting from the faults brought to light by long-time ownership of cars in the war years, John Oswald, of the General Motors Corporation, told the meeting of the Society of Automotive Engineers, held in Detroit. Manufacturers are interested more than ever before in the difficulties of long-time ownership, in some cases already totaling six years of operating the same car, he pointed out.

The majority of the faults present in the cars being driven on the roads today are quite common to a percentage of all makes of cars and are disclosed by long-time ownership, he remarked.

Thousands of car owners who don't have a garage have experienced difficulty in locking their cars when tumblers in the lock stick, and when the mechanism that opens and closes the windows fails to function, Mr. Oswald pointed out.

This is only a minor problem, he stated, compared to the starting and ignition systems with a distributor cap that has collected a lot of dust, spark plug wires

slightly deteriorated, the starter a little worn, battery efficiency reduced, and a little precipitation during the night—all of which adds up to difficulty in starting the engine in the morning.

One of the major reasons for the apparent weakness of the electrical system on today's automobile is the limited capacity of the battery and the length of time it takes the generator to replace the electrical energy that can be consumed so quickly, Mr. Oswald declared. Part of the high current consumption is due to electrically-operated accessories. The speaker suggested that all car manufacturers step up the capacities of their automobile electrical systems for the benefit of both short- and long-time owners.

Keeping down wear on front tires has become a major problem on many cars, he stated. Maintaining correct tire pressure has been the easiest of the tire conservation efforts, and correct wheel alignment the most difficult. The necessity of maintaining the original geometry of front suspension systems to minimize tire wear was almost unknown to many who now have become long-time car owners

and find alignment correction to be rather expensive. Mr. Oswald recommended that front-end suspension systems should receive more attention from engineers and that the cost of replacing worn parts and alignment procedure time be reduced.

More miles per gallon may become an important consideration after the war as a result of limited-speed driving and fuel rationing during the war years. Therefore, Mr. Oswald points out, automobile manufacturers should be prepared to give postwar buyers the facts about aviation or high-octane gasoline that gasoline manufacturers are promising will give a potential increase in miles per gallon.

Few long-time owners register complaints on engine performance and engine life, he stated. The difficulty of excessive oil consumption has continued to be one of the few items of concern on high mileage cars but it has improved.

Corrosion, the rusting away of body and interior parts, is due largely to inadequate water drainage and insufficient ventilation, reports Mr. Oswald. Car manufacturers plugged all the holes and sealed all the joints to keep dust out of the car and they did such a good job that moisture which collects is retained long enough to increase corrosion. Present owners may be quite perturbed when they find out how much the rusted-away bodies will subtract from trade-in values when new cars are again offered for sale. Mr. Oswald pointed out that some corrosion problems may be solved by new designs eliminating some of the joints, better protective coatings, and improved ventilation and drainage. However, any additional cost for improvement will be reflected in the selling price of the car.

Long-time ownership has made the driving public more conscious of the quality of exterior finishes and chrome plate. After owning the same car for several years, many buyers of conservative cars have had an advantage over those who were attracted by pastel hues. Some of the latter may think a long time before purchasing another car for its color value, Mr. Oswald predicted.

Science News Letter, January 27, 1945

Mueller-Ward Models ARE ORIGINAL AUTHORITATIVE GRAPHIC LEARNING AIDS

Models constructed by Dr. Justus F. Mueller of Syracuse University have been acclaimed as most beautiful, accurate, explicit teaching aids. An ever-growing series of models for zoological and parasitological study is being made available. Designed by Dr. Mueller, they are produced by the skilled craftsmen and artists of Ward's model department. A new Ward's catalog describes 83 Mueller-Ward models; a copy should be in the hands of every zoology instructor and general science department. Ask for catalog N-445.

WARD'S NATURAL SCIENCE
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Commercial fur farming has greatly decreased during the war because of the difficulty of getting the meats, cereals and vegetables on which foxes, minks and other fur-bearing animals are raised.

Slender fluorescent lighting tubes up to 96 inches in length have been developed and will be available after the war; they are of the high-efficiency hot cathode type.

PUBLIC HEALTH

Surgical Care for 52 Cents Per Month

AT A COST of 52 cents a month for one person, working men and women of New York City with incomes up to \$1,800 can get pre-paid surgical care in hospitals through United Medical Service, the "doctors' plan" launched by the Coordinating Council of the five New York County Medical Societies.

Complete payment of physicians' and surgeons' fees for surgical operations, the treatment of fractures (broken bones) and dislocations, and maternity care including pre-natal and post-natal care is assured under this plan. The cost to husband and wife is \$1.12 per month and for a family \$2. This is for families with incomes up to \$2,500 a year. Those with higher incomes may subscribe but the physician treating them may bill them for more than he receives from United Medical Service.

A more comprehensive service to cover medical needs and to include subscribers with higher incomes is planned for the future if growth of enrollment, financial surplus and experience with the present project make such expansion possible.

United Medical Service already has accumulated a surplus fund of \$150,000 through the operations of one of its predecessor organizations, Community Medical Care, Rowland H. George, president, stated. No further contributions are needed to launch the project for pre-paid surgical and obstetrical care.

Dr. Nathan B. Van Etten, past president of the American Medical Association, is chairman of the board.

Subscribers will have free choice of physicians. Participating physicians will be paid specified fees based on rates similar to workmen's compensation schedules. Non-participating physicians will be paid up to 75% of the specified fees. Physicians' bills in excess of the fees to persons with incomes of \$2,500 to \$3,500 may be submitted to a physicians' review committee for reconsideration.

The Associated Hospital Service of New York is acting as sales organization for UMS. Membership in UMS at this time will be limited to employed groups of 50 or more which are enrolled through payroll deduction in the Blue Cross hospitalization plan. To be eligible these groups must comprise at least 75% of the total number of employees in an organization. An exception will be made for groups of 25 or more provided the employer pays the enrollment fees.

Science News Letter, January 27, 1945

Books of the Week

THE AERONAUTICAL DICTIONARY—Thomas A. Dickinson—*Crowell*, 484 p., illus., \$2.75.

THE ARC SPECTRUM OF IRON (Fe I)—*Am. Philosophical Soc.*, 207 p., paper, \$2.25, (Trans. of the Society, New Series, vol. XXXIV, part II).

ARCHAEOLOGICAL INVESTIGATIONS IN EL SALVADOR—John M. Longyear, III—*Peabody Museum*, 90 p., paper, illus., \$3.75, (Memoirs of the Peabody Museum of Archaeology and Ethnology, Harvard Univ., vol. IX, no. 2).

CLIMATOLOGY—Bernhard Haurwitz and James M. Austin—*McGraw*, 410 p., illus., \$4.50.

FUNDAMENTAL PRINCIPLES AND PROCESSES OF PHARMACY—Henry M. Burlage and others—*McGraw*, 615 p., illus., \$4.50.

AN INTRODUCTION TO THE ARCHAEOLOGY OF CUZCO—John H. Rowe—*Peabody*

Museum, 63 p., paper, illus., \$2.50.

THE PHYSICS OF FLIGHT—Alfred Landé—*Reinhold*, 122 p., illus., \$2.50.

PIONEERING THE HELICOPTER—Charles Lester Morris—*McGraw*, 161 p., illus., \$2.75.

PROCEEDINGS OF THE AMERICAN PHILOSOPHICAL SOCIETY—*Am. Philosophical Soc.*, 536 p., paper, illus., \$1.25, (vol. 88, no. 6).

PRODUCTION ENGINEERING IN THE AIRCRAFT INDUSTRY—A. B. Berghell—*McGraw*, 307 p., illus., \$3.

VIBRATION ANALYSIS—N. O. Myklestad—*McGraw*, 303 p., illus., \$3.50.

VITALIZED FUNDAMENTALS OF MACHINES—Robert H. Carleton—*College Entrance Bk. Co.*, 186 p., paper, illus., 60c.

VITALIZED PHYSICS IN GRAPHICOLOR—Robert H. Carleton—*College Entrance Bk. Co.*, 378 p., paper, illus., 80c.

Science News Letter, January 27, 1945

THE CHEMICAL ELEMENTS
Compiled by
PHILIP S. CHEN, Ph. D.
PROFESSOR OF CHEMISTRY, ATLANTIC UNION COLLEGE

WALL CHART
(Actual Size 38 x 50 inches)
CONTAINS THE FOLLOWING
UNBELIEVABLY VAST AMOUNT OF INFORMATION
CONCERNING EACH ELEMENT

Periodic table (based on atomic numbers)
Group and family
Name in English, German, and French
Discovery Date, discoverer, nationality
Symbol and atomic number
Arrangement of electrons in orbits
Atomic weight
Logarithm of atomic weight
Molecular form and color
Crystalline form and color
Specific gravity or density
Melting and boiling points
Specific heat

Heat of vaporization and fusion
Heat conductivity
Coefficient of thermal expansion
Occurrence, preparation, and uses
The radioactive elements
Activity series
Distribution in earth crust, in ocean, in atmosphere, and in human body
Properties of principal metals
Mechanical properties of principal metals
Melted aluminum production in U. S. A.
Alchemical symbols
Critical constants
Flame and borax bead tests
Index to the elements for gaseous elements

The chart is so self-explanatory that a key, which is usually necessary for other charts, is not necessary for its intelligent use. Numerical values are given for constants that are represented in other charts by signs and varying length of lines or columns.

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•New Machines and Gadgets•

FLAK SHAWLS, blankets, and curtains are being perfected by the Army Airforce Materiel Command to protect fighter and bomber crews. The shawl, a sort of horse collar with special tail pieces, interferes less with body movements than bulky armor.

Science News Letter, January 27, 1945

TRI-ALLOY BEARINGS for automobile engines and other parts, developed to replace prewar cadmium bearings, are made of 35% to 40% lead, 4.5% to 5% silver, 0.5% iron, and the balance copper. Tests indicate the so-called tri-alloy bearings to be highly satisfactory.

Science News Letter, January 27, 1945

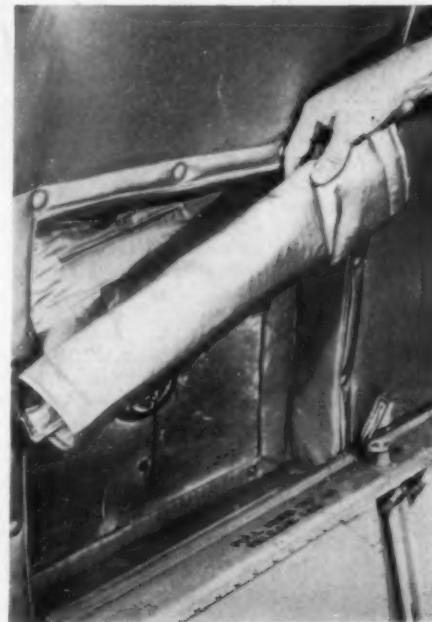
SLIDERULE with decimal-point locator makes it possible for a person with limited mathematical background to solve and place the decimal point up to 19 places in difficult problems. Its simple, positive, mechanical method of placing the decimal point eliminates one of the biggest blocks in using a sliderule.

Science News Letter, January 27, 1945

CIRCULAR POWER SAW for felling trees, improved design, runs parallel to the ground at the end of an arm projecting from a two-wheel mount guided by plow handles. The mount carries a six-horse-power air-cooled gasoline engine belted to the saw axis. A 24-inch hardwood tree can be felled in three minutes.

Science News Letter, January 27, 1945

GLASS-LINED BLANKETS, a half-inch thick, are used to insulate Army planes and will probably be used in commercial planes after the war. The photo shows the installation of this material, made up of tiny glass fibers mount-



ed on a durable trim cloth, around a window and the protective curtain being rolled.

Science News Letter, January 27, 1945

HYDRO-BORING machine, especially adapted for the boring of connecting rods, piston bushings, knuckle-pin holes and other boring jobs on aircraft engines, has a boring bar hydraulically operated, thus eliminating vibration. Boring heads on this precision apparatus have direct micrometer readings.

Science News Letter, January 27, 1945

MULTI-WEAVING is a term applied to a new process in which metals, plastics, woods, rubber, and certain fabrics, may be combined into a composite

material for floor covering, ventilating and other grilles, lawn furniture and other uses. The narrow stripping is woven into many designs.

Science News Letter, January 27, 1945

BOAT PORTAGE is made easy by means of a wheel attached above the bow, and slots to hold the paddles or oars in a projecting position from the stern on opposite sides so that they may be used as wheelbarrow handles. During portage the boat is upside-down, one end resting on the wheel and the other carried by the handles.

Science News Letter, January 27, 1945

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D.C., and ask for Gadget Bulletin 248.

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